REMARKS

The following remarks are made in response to the Office Action mailed June 14, 2005. Claims 1-6 and 9-30 were rejected. Claims 7 and 8 have been objected to. With this Amendment and Response, claims 1-3, 7, 8, 14, 17, 19-22, 28, and 30 have been amended and new claims 31 and 32 have been added. Claims 1-32 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 102

The Examiner rejected claims 1-6 and 9-30 under 35 U.S.C. § 102(e) as being anticipated by the Perner United States Patent 6,504,779 (Perner). Applicants submit that claims 1-6 and 9-30 are not anticipated by Perner.

Amended independent claim 1, recites a magnetic memory including an array of memory cells configured to provide first logic value and second logic value resistive states, and a read circuit. The read circuit is configured to sense a resistance through a memory cell in the array of memory cells to obtain a sense result and categorize the sense result into one of at least three different categories including a middle category situated between the first logic value and second logic value resistive states.

Perner is directed to devices for data storage and retrieval and, more particularly, to a method and apparatus for testing for acceptable calibration of a sense amplifier. See column 1, lines 8-23. The resistance of a memory cell is determined by a current-to-time conversion resulting in a time value. A pair of short and open test limit values is set at preferred time values and a pair of recalibration high and recalibration low limit values is set at other preferred time values. If a short or open condition is detected, the recalibration test result is ignored. If a short or open condition is not detected, the sensed time value is compared to the recalibration high and recalibration low limit values. If the sensed time value is between the recalibration high and recalibration low limit values, sensing of the memory cell proceeds and no recalibration of the sense amplifier is performed. If the sensed time value exceeds the recalibration high and recalibration low limit values and is between the short and open test limit values, sensing of the memory cell stops and a sense amplifier recalibration is initiated. See column 2, line 49 - column 3 line 35.

Applicants submit that Perner fails to disclose the invention of independent claim 1. Perner fails to teach or suggest a read circuit configured to categorize the sense result into one of at least three different categories comprising **a middle category situated between the first logic value and second logic value resistive states.** The Examiner relates the resistive states in Applicants' independent claim 1 to short and open conditions in Perner. See Office Action, Examiner's Remarks, Section 5. Applicants have amended independent claim 1 to clarify that the first logic value and second logic value resistive states are logic value resistive states. In contrast, in Perner, values between the recalibration high and recalibration low limit values include memory cells within a normal range, which store either of the logic values "0" or "1". Further, there is no middle category within the normal range of Perner, as claimed by Applicants. Applicants request that the above rejection of independent claim 1 under 35 U.S.C. § 102(e) be withdrawn.

Dependent claims 2-6 and 9-13 depend directly upon independent claim 1, which as indicated above Applicants believe to be in allowable form. Accordingly, Applicants also believe these dependent claims to be allowable over the art of record.

Similarly, Applicants submit that Perner also fails to disclose the invention of amended independent claims 14 and 22. Perner fails to teach or suggest **a category between a first logic value resistive state category and a second logic value resistive state category** (independent claim 14), and **a middle region situated between the first logic value resistive state region and the second logic value resistive state region** (independent claim 22). Accordingly, Applicants request that the rejection of independent claim 14 and independent claim 22 under 35 U.S.C. § 102(e) be withdrawn.

Dependent claims 15, 16 and 23-25 depend directly upon corresponding independent claims 14 and 22, which as indicated above Applicants believe to be in allowable form. Accordingly, Applicants also believe these dependent claims to be allowable over the art of record.

Perner also fails to disclose the invention of amended independent claim 17. Perner fails to disclose **a read circuit configured to sense a resistance through the memory cell to obtain a sense result and provide immediate calibration if the sense result indicates a shorted memory cell and if the sense result indicates an open memory cell.** In contrast, in Perner a sense amplifier senses the resistance value of a memory cell and

if a shorts or opens condition is detected the recalibration test result is ignored. A shorted or open-circuited memory cell will not trigger a recalibration. See column 2, line 60 - column 3, line 6; column 3, lines 15 - 21; column 6 lines 46 – 57; and column 7 lines 22 - 25.

Further, Perner fails to teach or suggest **a delayed calibration if the sense result indicates the resistance is greater than a shorted memory cell and less than a first logic value resistive state of the memory cell and if the sense result indicates the resistance is less than an open memory cell and greater than a second logic value resistive state of the memory cell**. In contrast, in Perner, if the sensed result exceeds the recalibration high and recalibration low limit values and lies between the shorts and opens test limit values, sensing of the memory cell stops and a sense amplifier recalibration is initiated. See column 3, lines 28 - 35; column 7, lines 33 - 41; and Figure 7 in Perner. Accordingly, Applicants request that the above rejection of independent claim 17 under 35 U.S.C. § 102(e) be withdrawn.

Dependent claims 18-21 depend either directly or indirectly upon corresponding independent claim 17, which as indicated above Applicants believe to be in allowable form. Accordingly, Applicants also believe these dependent claims to be allowable over the art of record.

Perner also fails to disclose the invention of independent claim 26. Perner fails to disclose **categorizing the first sense result into regions comprising immediate calibration and delayed calibration regions**. In contrast, in Perner, sense amplifiers are calibrated if the sensed result exceeds the recalibration high and recalibration low limit values and lies between the shorts and opens test limit values. Accordingly, Applicants request that the above rejection of independent claim 26 under 35 U.S.C. §102(e) be withdrawn.

Dependent claims 27-30 depend either directly or indirectly upon corresponding independent claim 26, which as indicated above Applicants believe to be in allowable form. Accordingly, Applicants also believe these dependent claims to be allowable over the art of record.

Allowable Subject Matter

The Examiner objected to claims 7 and 8 for being dependent upon a rejected base claim, but as being allowable if rewritten in independent form including all limitations of the base claim and any intervening claims. Applicants agree with the Examiner's conclusions regarding patentability without necessarily agreeing with or acquiescing in the Examiner's reasoning. In particular, applicants believe that the claims are allowable because prior art fails to teach, anticipate or render obvious the invention as claimed, independent of how the invention is paraphrased.

Accordingly, Applicants have rewritten claims 7 and 8 into independent form. Allowance of these claims is requested.

Added New Claims

Applicants have added new claims 31 and 32 directed to a magnetic memory. No new matter has been added. Applicants submit that claims 31 and 32 are also allowable over the art of record.

CONCLUSION

In view of the above, Applicants respectfully submit that pending claims 1-32 are in form for allowance. Consideration and allowance of claims 1-32 is respectfully requested.

The Examiner is invited to contact the Applicants' representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to either Philip S. Lyren at Telephone No. (281) 514-8236, Facsimile No. (281) 514-8332 or Steven E. Dicke at Telephone No. (612) 573-2002, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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CERTIFICATE UNDER 37 C.F.R. 1.8: The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail, in an envelope address to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 13 day of September, 2005.

By Steven E. Dicke
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